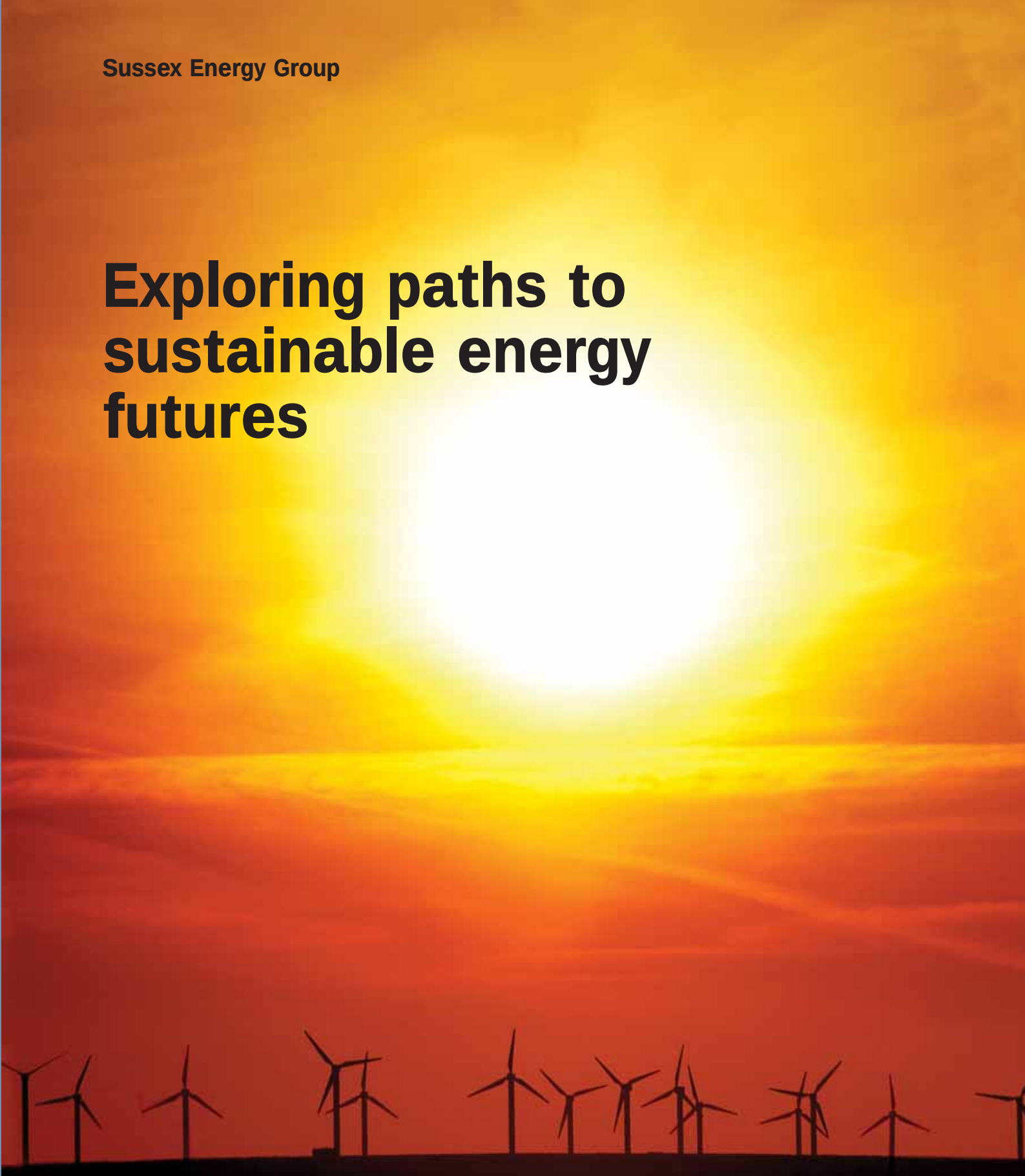
Sussex Energy Group

Exploring paths to sustainable energy futures



University of Sussex
SPRU – Science & Technology Policy Research

Paths to sustainable energy

What needs to happen to put us on a sustainable energy path?

There is growing awareness that the transition to a sustainable energy economy is one of the main challenges facing us in the 21st Century. Although climate change is a significant factor, there are many other reasons why we need to address the energy transition, including security of supply, fuel poverty and the opportunities offered by innovations such as renewable energy resources, distributed generation and combined heat and power.

Critically, the transition needs to be designed in such a way that maximises economic efficiency. An effective response requires technical ingenuity, behavioural change and virtually unprecedented political commitment. The complexities and uncertainties involved are similarly great, and conflicts of interest abound.

These are the challenges that the Sussex Energy Group is addressing. We undertake academically excellent research that is also relevant to the needs of policy-makers and practitioners. We pursue these questions in close interaction with the diverse groups in government, business and civil society who will need to make the changes happen.

Three themes link together in addressing the challenge of such a transition:

- How to appraise the options for technology and policy around transitions.
- How transitions occur, how technology can be 'shaped', and how technological regimes can be managed.
- How to govern the complex and uncertain transition processes.

Appraisal

A successful transition to a sustainable energy economy demands careful analysis and deliberation over the pros and cons of a variety of technology and policy options.

Our research on Strategic Appraisal aims to find new ways to combine the clarity and rigour of quantitative techniques with the subtlety and scope of qualitative approaches. We are developing new integrated methods, while delivering concrete evidence for public policy and corporate strategies.

Key questions include:

- How can the environmental, economic and social imperatives of sustainability be squared with the challenges of system integration, energy security and public acceptability?
- How can we make long-term energy strategies as robust as possible in the face of rapidly changing sources and types of uncertainty and surprise? What lessons can be learned from past experience?
- How can we balance the requirements of specialist analysis, interdisciplinary deliberation, stakeholder engagement and public participation? Who should be involved, in which context, on what terms and when?

Transitions

The transition to a sustainable energy economy will require profound transformations in:

- The technologies, systems and infrastructures for energy service delivery.
- The capabilities of technology suppliers.
- The behaviour of energy users.

Our research is developing models and tools for explaining and managing technological transitions, especially the specific challenge of achieving a sustainable energy economy. The research draws on case studies from the UK and other countries, including rapidly developing economies such as China.

Key questions include:

- What mechanisms contribute to the establishment and lock-in of energy systems, under what conditions do new technologies become established, and by what mechanisms does one ultimately replace the other?
- Which scenarios for energy system transitions are compatible with both the long-term objective of a sustainable energy economy and the constraints imposed by competing objectives and interests?
- What is the appropriate role of public policy at different stages of energy system transitions and what policies can be recommended to facilitate such transitions?

Governance

The transition to a sustainable energy economy will require a mix of policies that address the whole energy system, including the built environment, transport infrastructures and the multitude of technologies for energy conversion. These policies must be negotiated and coordinated through networks of public, private and voluntary organisations at many levels and over varying geographical scope.

Our research on governance combines analysis for governance, which seeks to understand a policy problem and suggest appropriate solutions, with analysis of governance, which seeks to understand and explain the governance processes themselves.

Key questions include:

- What are the motivations, incentives, conflicts and barriers that shape individual and organisational behaviour in relation to energy supply and use in different areas?
- What explains the structure, operation and outcome of the governance processes influencing energy systems and what is the relative role of interests and ideas?
- What are the factors that act for and against the integration of energy policy objectives in different areas and what are the consequences of any lack of integration?

Engaged approach

We pursue a research strategy that builds in interactions with diverse groups from the start. Three principles underpin this approach:

- Engagement improves the quality and substance of our work as well as ensuring that what we do contributes to learning.
- Interaction with diverse groups can help protectagainst undue influences by any one group.
- Independent researchers can provide the setting in which to bring together diverse groups from across society to discuss difficult challenges.

These principles of engagement, diversity and facilitation help to ensure the relevance and independence of our research. We use our independence to provide:

- Critical yet constructive advice for those involved in policy and practice;
- Neutral spaces in which a broad range of players can meet;
- Reliable, informed comment in the media.

SPRU and the Freeman Centre

The Sussex Energy Group is part of SPRU, the world's first and largest institute dedicated to the study of science and technology policy. SPRU has around 70 academic and professional support staff, 70 doctoral and 50 masters students. SPRU is situated at the Freeman Centre, a world-class facility that has been specially designed to enable interactive styles of research, teaching and consulting in the area of science, technology and innovation.

The SPRU Environment Programme

SPRU's wider Environment Programme addresses the sustainability challenges generated by science and technology. While science and technology have helped to achieve enormous improvements in human welfare, they have also contributed substantially to damaging the natural world and human health.

The Environment Programme addresses these challenges through research and teaching, including its leadership of the SPRU Masters degree in Science and Technology for Sustainability. Our current research includes:

- agriculture, food and the environment – how do we weigh up the merits of different and sometimes conflicting agricultural technologies such as GM food and organic production?
- sustainability in developing countries – how can poor countries best harness science and technology?
- science in policy – what is the role of scientific evidence, expertise and advisors in policymaking?

Support for our research

The Sussex Energy Group receives support from a range of government departments, agencies and private sector firms as well as core funding in the form of a 5-year grant from the UK's Economic and Social Research Council. We provide a range of research and consulting services relevant to those involved in energy provision and energy policy. Please get in touch if you think we might be able to help.

For further information please see our web pages **www.sussex.ac.uk/sussexenergygroup**

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